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ON THE GORILLA (*TROGLODYTES GORILLA*, SAV.)*.

BY PROF. OWEN, F.R.S., V.P.Z.S., &c.

Before referring to earlier indications of the truly extraordinary animal of which an entire specimen has now been obtained,—indications scarcely more instructive or convincing to the naturalist than those afloat on the Unicorn or Succatyro,—the author proceeded briefly to recapitulate the steps which led to the determination and full knowledge of the great anthropoid Ape of Africa called *Troglodytes gorilla*.

The first authentic information he had received of its existence was by a letter from Dr. Savage, dated 'Gaboon River, West Africa,' April 24, 1847, inclosing a sketch of the cranium, and requesting that the results of Prof. Owen's comparison might be communicated to him. That letter and those results are given in the 'Proceedings of the Zoological Society' for February 22, 1848; together with the description of three skulls, two of male and one of a female, which had been transmitted from the Gaboon to England, and which established the distinction of the species (*Troglodytes gorilla*) from the Chimpanzee (*Troglodytes niger*)†.

The skulls obtained by Dr. Savage, at the Gaboon, were taken by him to Boston, U. S., and were described by the Doctor and Prof. Wyman, in the 'Journal of the Natural History Society of Boston,' vol. v., 1847, and the name *Troglodytes gorilla* was proposed for the species, the discovery of which is due to Dr. P. S. Savage.

Translations of Dr. Wyman's and Prof. Owen's papers being published in the 'Annales des Sciences Naturelles', the attention of Continental Naturalists was strongly excited toward this unexpected addition to the Mammalian class; and the inducements held out for the collection of specimens speedily led to the acquisition of the requisite materials for completing the zoographical history of the animal which it seems now agreed to call 'Gorilla.' The additional materials which reached London, enabled the author to communicate to the Zoological Society ('Proceedings of the Zool. Soc.' for Nov. 11th, 1851.)‡ a description of the entire skeleton of the *Troglodytes gorilla*; of which, however, owing to the number and cost of the illustrations, two parts only have yet appeared in the 'Transactions of the Society' (vol. iv., pt. iii., p. 75, pls. 26–30 & pt. iv., p. 89, pls. 31–36.): but the main facts are recorded in the author's Catalogue of the 'Osteological Collection in the Museum of the Royal College of Surgeons,' 4to, pp. 782–804. Entire skeletons

* This paper will be printed in the 'Transactions,' illustrated with several plates.

† 'Transactions of the Zool. Soc.' vol. iii., p. 381, pls. 58–63.

‡ See also 'Literary Gazette,' Nov. 15, 1851.

of the full-grown *Troglodytes gorilla* are now set up in the Museum of the College, and in the British Museum ; and Dr. Gray has finally acquired for the National Collection the stuffed specimen of a nearly adult male Gorilla.

All the foregoing specimens were obtained from a part of the west coast of tropical Africa traversed by the rivers 'Danger' and 'Gaboön,' in latitudes 1° to 15° S.

A corresponding series of illustrations, first crania, then the skeleton, finally an entire specimen of the *Troglodytes gorilla*, have successively reached the Museum of the Garden of Plants, Paris, and have afforded materials for interesting and instructive memoirs from the accomplished Professors in that noble establishment for extending and diffusing the science of Natural History.

De Blainville had caused a lithograph to be prepared of the skeleton of the Gorilla, shortly before his demise. His successor, Prof. Duvernoy, communicated a description of this skeleton to the Academy of Sciences in 1853, which is published, with some interesting particulars of the anatomy of the soft parts, in the 'Archives du Muséum d'Histoire Naturelle,' tome vii. (1855). The Memoirs and Observations by his accomplished colleague the Professor of Mammalogy and Ornithology, Isidore Geoffroy St. Hilaire, on the Gorilla will be found in the 'Comptes Rendus de l'Académie des Sciences,' January 19, 1852, and subsequent numbers ; in the 'Revue de Zoologie,' No. II., 1853 ; the whole being summed up in the part of his excellent 'Description des Mammifères nouveaux,' &c. 4to, which appeared in vol. x. of the 'Archives du Muséum, 1858.'

The differences in the results of the observations by the American, French, and English authors, relate chiefly to the interpretation of the facts observed. Dr. Wyman agrees with Prof. Owen in referring the Gorilla to the same genus as the Chimpanzee, but he differs from him in regarding the latter as being more nearly allied to the Human kind. Professors I. Geoff. St. Hilaire and Duvernoy regard the differences in the osteology, dentition, and external characters of the Gorilla to be of generic importance, and enter it in the Zoological Catalogue as *Gorilla Gina*, the *nomen triviale* being taken from 'Weggeena ;' 'N. Gina' and 'D. jina,' as the name of the beast in the Gaboon tongue, has been diversely written by voyagers*. The French naturalists also concur with the American in placing the Gorilla below the Chimpanzee in the scale. The author returned to the discussion of those questions at the conclusion of his paper, when he also referred to the notion current in some works that the long-armed apes (*Hylobates*), and not the Orangs or Chimpanzees, were the most anthropoid of apes.

Entering upon the description of the exterior characters of the

* The main discrepancy, in regard to matter of fact, is that the arms of the Gorilla are stated by Isid. Geoffroy, to be much longer, whilst Prof. Owen found them to be relatively shorter, than those of the Chimpanzee.

" Bras { de proportions presque humaines Genre I. *Troglodytes*.
 { beaucoup plus longs que chez l'homme ... Genre II. *Gorilla*."

Isid. Geoffr., p. 15

adult male Gorilla, the stuffed skin of which is now in the British Museum, Prof. Owen first called attention to the shortness, almost absence, of the neck, due to the backward articulation of the head to the trunk and the concomitant development of the spines of the neck-vertebræ; also to the chin which, in the usual pose of the head, descends below the *manubrium sterni*; to the great size of the scapulæ, to the elevation of the acromion, and the oblique position of the clavicles which rise from their sternal attachments obliquely to above the level of the angles of the jaw. The brain-case, low and narrow, passes in the old male in an almost straight line from the occiput to the superorbital ridge, the prominence of which gives the most forbidding feature to the physiognomy of the Gorilla. It is a feature strongly marked on the skeleton, but is exaggerated in the stuffed animal by the thick supraciliary roll of integument which forms a scowling penthouse over the small deep-set eyes. The nose is a more prominent feature than in the Chimpanzee or Orang-utan; there is a slight median rise along its upper half, answering to the feeble prominence of the same part of the nose-bones, but the lower or alar part of the nose offers two thick projections, arching, each across its own nostril, and becoming thicker as it subsides in the upper lip. There is a median longitudinal depression between these arched flaps; but their prominence brings them into view in the profile of the face. The point of median confluence of the alæ projects a little beyond the fore part of the 'septum narium.' The resemblance to the lowest form of the negro nose is much closer in the Gorilla than in the Chimpanzee. The mouth is wide, the lips large and thick, but of uniform thickness, the upper one terminating by a straight, almost as if incised, margin; but being relatively shorter than in the Chimpanzee. The dark pigment is continued from the base of the lip to this margin, and no part of the red inner lining would be visible when the lips were naturally closed: a little of this lining, which forms what is commonly understood by 'lip' in man, might be shown by the under lip of the Gorilla, but it is obscured by added pigment, as in most negro races. The chin is short and receding, but the whole face is prominent. The circumference of a front view of the head presents an oval with the great end downward and the upper end very narrow, owing to the parietal ridge, in the old male. The superorbital or cranial part is confined to the upper fourth in this view, and the bestial aspect of the visage is much increased when the huge prominent tusks are exposed by opening the lips. The eyelids have eyelashes almost as in man; but the eyebrow is not defined, the hair of the head extending to the supraciliary roll, which is almost devoid of hair. In a direct front view the ears are rather above the level of the eyes: they are as much smaller in proportion to the head, as in the Chimpanzee they are larger, in comparison with man; but in structure they resemble the human auricle more than does the ear of any other ape.

The tragus and anti-tragus, the helix and anti-helix, the concha, the fossa of the anti-helix and the lobulus are distinctly defined: the

chief difference is the large size of the concha compared with the fossa of the anti-helix and the lobulus : but though the lobulus is small it is distinctly marked and pendulous, while it is sessile in the Chimpanzee and Orang. Both tragus and anti-tragus are nearly as prominent as in man. The helix is reflected or folded centrally from its origin to opposite the anti-tragus as in man, whereas, in the Chimpanzee the fold subsides opposite the fossa of the anti-helix, and the rest of the margin of the auricle is simple, not folded. The upper part of the helix is more produced in the Gorilla than in man, and the greatest breadth of the ear is above the concha, in which the incisura intertragica is less deep than in man.

The skin of the face is naked and much wrinkled ; a pretty deep indent divides the nasal ala from the cheek, and becomes shallower as it bends upward, inward, and downward to the median indent between the alæ. The hairy part of the scalp is continued to the superorbital prominence, and thence the hair-clad skin is continued outward and downward upon the sides of the deep cheeks, where the hair is long. The chest is of great proportional capacity, and the shoulders very wide across. The profile of the trunk behind describes a slight convexity from the nape, which projects beyond the occiput, downward to the sacrum : there is no inbending at the loins, which seem wanting. The abdomen is prominent both before and at the sides. The pectoral regions are slightly marked and show the pair of nipples placed as in the Chimpanzee and Man. In the male the penis is short and subconical, the prepuce is devoid of frænum ; the scrotum is broader and more sessile than in man : the perinæum is longer, the anus being placed further back than in man. There is no trace of ischial callosities. The glutæi are better developed and give more of the appearance of nates than in any other anthropoid ape, but they do not project so as to meet beyond the anus and conceal it.

The chief deviations from the human structure are seen in the limbs, which are of great power, the upper ones prodigiously strong, making by comparison the legs, through the want of 'calves', look feeble.

The first characteristic is the almost uniform thickness of each segment of the limb : this is seen in the arm, from below the short deltoid prominence to the condyles, neither biceps nor triceps making any definite swelling ; a like uniform thickness is seen in the antibrachium from below the olecranon to the wrist : the leg a little increases in thickness from the knee to the ankle : the short thigh shows some decrease as it descends : but there is a general absence of those partial muscular enlargements which impart the graceful varying curves to the outlines of the limbs in man. Yet this, upon dissection, is found to depend rather on excess, than defect, of development of the carneous as compared with the tendinous parts of the limb-muscles, which thus continue of almost the same size from their origin to their insertion, with a proportionate gain of strength to the beast. The difference in the length of the upper limbs between the Gorilla and Man is but little in comparison with the trunk ; it appears

greater through the arrest of development of the lower limbs. Very significant of the closer anthropoid affinities of the Gorilla is the superior length of the arm (humerus) to the fore-arm, as compared with the proportions of those parts in the Chimpanzee. The hair of the arm inclines downward, that of the fore-arm upward, as in the Chimpanzee. The thumb extends a little beyond the base of the proximal phalanx of the fore-finger; it does not reach to the end of the metacarpal bone of that finger in the Chimpanzee or any other ape: the thumb of the Siamang (*Hylobates syndactyla*) is still shorter in proportion to the length of the fingers of the same hand: the philosophical zoologist will see great significance in this fact. In man the thumb extends to, or beyond, the middle of the first phalanx of the fore-finger.

The fore-arm in the Gorilla passes into the hand with very slight evidence, by constriction of the wrist, the circumference of which, without the hair, was fourteen inches, that of a strong man averaging eight inches. The hand is remarkable for its breadth and thickness, and for the great length of the palm, occasioned both by the length of the metacarpus and the greater extent of undivided integument between the digits than in man; these only begin to be free opposite the middle of the proximal or first phalanges in the Gorilla. The digits are thus short, and appear as if swollen and gouty; and are conical in shape after the first joint, by tapering to nails, which, being not larger or longer than those of man, are relatively to the fingers much smaller. The circumference of the middle digit at the first joint in the Gorilla is $5\frac{1}{2}$ inches; in man, at the same part, it averages $2\frac{3}{4}$ inches. The skin covering the middle phalanx is thick and callous on the back of the fingers, and there is little outward appearance of the second joint. The habit of the animal to apply those parts to the ground, in occasional progression, is manifested by these callosities. The back of the hand is hairy as far as the divisions of the fingers; the palm is naked and callous. The thumb, besides its shortness, according to the standard of the human hand, is scarcely half so thick as the fore-finger. The nail of the thumb did not extend to the end of that digit; in the fingers the nail projected a little beyond the end, but with a slightly convex worn margin, resembling the human nails in shape, but relatively less.

In the hind limbs, chiefly noticeable was that first appearance in the quadrumanous series of a muscular development of the gluteus, causing a small buttock to project over each tuber ischii. This structure, with the peculiar expanse, as compared with other *Quadrumana*, of the iliac bones, leads to an inference that the Gorilla must naturally and with more ease resort occasionally to station and progression on the lower limbs than any other ape.

The same cause as in the arm, viz. a continuance of a large proportion of fleshy fibres to the lower end of the muscles, coextensive with the thigh, gives a great circumference to that segment of the limb above the knee-joint, and a more uniform size to it than in man. The relative shortness of the thigh, its bone being only eight-ninths the length of the humerus (in man the humerus averages five-sixths

the length of the femur), adds to the appearance of its superior relative thickness. Absolutely the thigh is not of greater circumference at its middle than is the same part in man.

The chief difference in the leg, after its relative shortness, is the absence of a "calf," due to the non-existence of the partial accumulation of carneous fibres in the upper half of the gastrocnemii muscles, causing that prominence in the type-races of mankind. In the Gorilla the tendo-achillis not only continues to receive the "penniform" fibres to the heel, but the fleshy parts of the muscles of the foot receive accessions of fibres at the lower third of the leg, to which the greater thickness of that part is due, the proportions in this respect being the reverse of those in man. The leg expands at once into the foot, which has a peculiar and characteristic form, owing to the modifications favouring bipedal motion being superinduced upon an essentially prehensile quadrumanous type. The heel makes a more decided backward projection than in the Chimpanzee; the heel-bone is relatively thicker, deeper, more expanded vertically at its hind end, besides being fully as long as in the Chimpanzee. This bone, so characteristic of anthropoid affinities, is shaped and proportioned more like the human calcaneum than in any other ape. The malleoli do not make such well-marked projections as in man; they are marked more by the thickness of the fleshy and tendinous parts of the muscles that pass near them, on their way to be inserted into parts of the foot. Although the foot be articulated to the leg with a slight inversion of the sole, it is more nearly plantigrade than in the Chimpanzee or any other ape. The hairy integument is continued along the dorsum of the foot to the clefts of the toes, and upon the first phalanx of the hallux: the whole sole is bare.

The hallux (great toe, thumb of the foot), though not relatively longer than in the Chimpanzee, is stronger; the bones are thicker in proportion to their length, especially the last phalanx, which in shape and breadth much resembles that in the human foot. The hallux in its natural position diverges from the other toes at an angle of 60 deg. from the axis of the foot; its base is large, swelling into a kind of ball below, upon which the thick callous epiderm of the sole is continued. The transverse indents and wrinkles show the frequency and freedom of the flexile movements of the two joints of the hallux: the nail is small, flat, and short. The sole of the foot gradually expands from the heel forward to the divergence of the hallux, and seems to be here cleft, and almost equally, between the base of the hallux and the common base of the other four digits. These are small and slender in proportion, and their bases are enveloped in a common tegumentary sheath as far as the base of the second phalanx. A longitudinal indent at the middle of the sole, bifurcating—one channel defining the ball of the hallux, the other running towards the interspace between the second and third digit—indicates the action of opposing the whole thumb (which seems rather like an inner lobe or division of the sole), to the outer division terminated by the four short toes. What is termed the "instep" in man is very high in the Gorilla, owing to the thickness of the carneo-

tendinous parts of the muscles as they pass from the leg to the foot over this region. The mid-toe (third) is a little longer than the second and fourth; the fifth, as in man, is proportionally shorter than the fourth, and is divided from it by a somewhat deeper cleft. The whole sole is wider than in man—relatively to its length much wider,—and in that respect, as well as by the offset of the hallux, and the definition of its basal ball, more like a hand, but a hand of huge dimensions and of portentous power of grasp.

In regard to the outward coloration of the Gorilla, only from the examination of the living animal could the precise shades of colour of the naked parts of the skin be truly described. Much of the epiderm had peeled off the subject of the present description; but fortunately in large patches, and the texture of these had acquired a certain firmness, apparently by the action of the alcohol upon the albuminous basis. The able taxidermist, Mr. Bartlett, has availed himself of this circumstance in the correct and satisfactory preparation of the specimen now mounted for the British Museum. The parts of the epiderm remaining upon the face indicated the skin there to be chiefly of a deep leaden hue; it is everywhere finely wrinkled, and was somewhat less dark at the prominent parts of the supraciliary roll and the prominent margins of the nasal “alæ:” the soles and palms were also of a lighter colour.

Although the general colour of the hair appears, at first sight, and when moist, to be almost black, it is not so, but is rather of a dusky grey: it is decidedly of a less deep tint than in the Chimpanzee (*Trogl. niger*): this is due to an admixture of a few reddish, and of more greyish hairs, with the dusky-coloured ones which chiefly constitute the “pelage”: and the above admixture varies at different parts of the body. The reddish hairs are so numerous on the scalp, especially along the upper middle region, as to make their tint rather predominate there; they blend in a less degree with the long hairs upon the sides of the face. The greyish hairs are found mixed with the dusky upon the dorsal, deltoidal and anterior femoral regions; but, on the limbs, not in such proportion as to affect the impression of the general dark colour, at first view. The hairs are wavy, approaching to a woolly character. Near the margin of the vent are a few short whitish hairs, as in the Chimpanzee. The epiderm of the back showed the effects of habitual resting, with that part against the trunk or branch of a tree, occasioning the hair to be more or less rubbed off: the epiderm was here very thick and tough.

It is most probable, from the degree of admixture of different coloured hairs above described, that a living Gorilla seen in bright sunlight, would in some positions reflect from its surface a colour much more different from that of the Chimpanzee than appears by a comparison of the skin of a dead specimen sent home in spirits. It can hardly be doubted, also, that age will make an appreciable difference in the general coloration of the *Troglodytes gorilla*.

The adult male Gorilla measures five feet six inches from the sole to the top of the head, the breadth across the shoulders is nearly three feet, the length of the upper limb is three feet four inches,

that of the lower limb is two feet four inches ; the length of the head and trunk is three feet six inches, whilst the same dimension in man does not average three feet.

In the foregoing remarks the author had given the results of direct observations made on the first and only entire specimen of the Gorilla which had reached England. At the period when they were made, no other description of its external characters had reached him ; and if the majority of them be found to agree with previously recorded observations by naturalists enjoying earlier opportunities of studying similarly preserved specimens, the rarity and importance of the species might excuse, if it did not justify, a second description from direct scrutiny of a new specimen by an old observer of the anthropoid *Quadrumanæ*. A much more important labour, however, remained. The accurate record of facts in natural history was one and a good aim ; the deduction of their true consequences was a better. Professor Owen proceeded, therefore, to reconsider the conclusions from which his experienced French and American fellow-labourers in natural history differed from him, and in which it seemed he stood alone.

The first—it may be called the supreme—question in regard to the Gorilla was, its place in the scale of nature, and its true and precise affinities.

Is it or not the nearest of kin to human kind ? Does it form, like the Chimpanzee and Orang, a distinct genus in the anthropoid or knuckle-walking group of apes ? Are these apes, or are the long-armed Gibbons, more nearly related to the genus *Homo* ? Of the broad-breast-boned *quadrumanæ*, are the knuckle-walkers or the brachiators, *i.e.* the long-armed Gibbons, most nearly and essentially related to the human subject ? The author proceeded to discuss the first as the most important question.

At the first aspect, whether of the entire animal or of the skeleton, he freely admitted that the Gorilla strikes the observer as being a much more bestial and brutish animal than the Chimpanzee. All the features that relate to the wielding of the strong jaws and large canines are exaggerated ; the evidence of brain is less, its chamber is more masked by the outgrowth of the strong occipital and other cranial ridges. But the impression so made—that the Gorilla is less like Man—is the same which is derived from comparing a young with an adult Chimpanzee, or some small tailless monkey with a full-grown male Orang or Chimpanzee. Taking the characters that cause that impression at a first inspection of the Gorilla, most of the small South American monkeys are more anthropoid than it ; they have a proportionally larger and more human-shaped cranium, much less prominent jaws, with more equable teeth.

Referring to the skeletons of the adult males of the Gorilla, Chimpanzee, Orang, and Gibbon, Professor Owen remarked that the globular cranium of the last, and its superior size compared with the jaws and teeth, seemed to show the Gibbons to be more nearly akin to man than are the larger tailless Apes. And this conclusion had been adopted by a distinguished French palæontologist, M. Lartet,

and accepted by a high geological authority at home*. They cite the experienced Professor of Human Anatomy at Amsterdam as supporting this view; but Prof. Owen had failed to find any statement of the grounds upon which it was sustained. In the art. *Quadrumania* of Todd's "Cyclopædia of Anatomy," cited by Lartet,† Prof. Vrolik briefly treats of the osteology of the *Quadrumania* according to their natural families. In "a first genus, *Simia* proper, or ape," he includes the Chimpanzee or Orang, noticing some of the chief points by which these apes approach the nearest to man. He next goes to "the second genus, the Gibbons" (*Hylobates*); he notices their ischial callosities, and the nearer approach of their molars, in their rounded form, to the teeth of *Carnivora* than the molars of the genus *Simia*. Then, comparing the Siamang with other species of *Hylobates*, Vrolik says, "its skeleton approaches most to that of man;" which may be true in comparison with other Gibbons, but certainly is not so as respects the higher *Simiæ*. No details are given to illustrate the proposition even in its more limited application; but the minor length of the arms in the Siamang, as compared with *Hylobates lar*, was probably the character in point.

The appearance of superior cerebral development in the Siamang and other long-armed apes is due to their small size and the concomitant feeble development of their jaws and teeth. The same appearance makes the small platyrrhine Monkeys of South America equally anthropoid in their facial physiognomy, and much more human-like than are the great Orangs and Chimpanzees. It is an appearance which depends upon the precocious growth of the brain as dependent on the law of its development. In all *Quadrumania* the brain has reached its full size before the second set of teeth is acquired, almost before the first set is shed. If, however, a young Gorilla, Chimpanzee, or Orang, be compared with a young Siamang of corresponding age, the absolutely larger size and better shape of brain, the deeper and more numerous convolutions of the cerebrum, and the more completely covered cerebellum in the former, unequivocally demonstrate the higher organization of the shorter-armed Apes. "In the structure of the brain," writes Vrolik,‡ in accordance with all other comparative anatomists, "they" (Chimpanzee and Orang-utan) "approach the nearest to man." The degree to which the Chimpanzee and Orang so resembled the human type seemed much closer to Cuvier, who knew those great apes only in their immaturity, with their small milk-teeth and precociously developed brain. Accordingly, the anthropoid characters of the *Simia satyrus* and *Simia troglodytes*, as deduced from the facial angle and dentition, are proportionally exaggerated in the "Règne Animal."§ As growth proceeds, the milk-teeth are shed, the jaws expand, the great canines succeed their diminutive representatives, the temporal

* Lyell, Sir C. "Supplement to the Fifth Edition of a Manual of Elementary Geology," 1859, p. 15.

† "Comptes Rendus de l'Académie des Sciences, Juillet 28, 1856."

‡ Art. *Quadrumania*, "Cyclopædia of Anatomy," vol. iv. p. 195.

§ Ed. 1829, pp. 87, 89.

muscles gain a proportional increase of carneous fibres, their bony fulcra respond to the call for increased surface of attachment, the sagittal and occipital crests begin to rise; but the brain grows no more; its cranial box retains the size it showed in immaturity; it finally becomes masked by the superinduced osseous developments in those apes which attain the largest stature and wield the most formidably armed jaws. Yet under this show of physical force, the brain of both Orang and Chimpanzee is still the better and the larger, than is that of the little long-armed ape, which retains throughout life so much more of the characters of immaturity, especially in the structure of the skull.

The Siamang and other Gibbons have smaller, lower but longer upper canines, relatively, than in the Orangs and Chimpanzees; the permanent ones more quickly attain their full size, and are sooner in their place in the jaws; consequently the last molar teeth, *m* 3, come last into place as they do in the human species. But, if this be interpreted as of importance in determining the relative affinity of the longer-armed and shorter-armed apes to man, it is a character in which, as in their seeming superior cerebral development, the *Hylobates* agree with some much lower *Quadrumana* with still smaller canines.

The systematic zoologist, pursuing this most interesting comparison with clear knowledge of the true conditions and significance of a globular cranium and small jaws within the quadrumanous order, first determines and takes as his compass or guide-point the really distinctive characters of the human organization.

In respect to the cerebral test, he looks not so much for the relative size of the brain to the body, as for its relative size in the species compared one with another in the same natural group. He inquires what quadrumanous animal shows absolutely the biggest brain? what species shows the deepest and most numerous and winding convolutions? in which is the cerebrum largest, as compared with the cerebellum? If he finds all these characters highest in the Gorilla, he does not permit himself to be diverted from the just inference because the great size and surpassing physical power attained in that species mask the true data from obvious view.

The comparative anatomist would look to the cæcum and the ischial integument: if he found in one subject of his comparisons (*Troglodytes*) a long "appendix vermiformis cæci," as in man, but no "callosities,"—in another subject (*Hylobates*) the ischial callosities, but only a short rudiment of the cæcal appendix,—he would know which of the two tailless Apes were to be placed next "the Monkeys with ischial callosities and no vermiform appendix," and which of the two formed the closer link toward man. He would find that the anthropoid intestinal and dermal characters were associated with the absolutely larger and better developed brain in the Gorilla, Chimpanzee, and Orang; whilst the lower quadrumanous characters exhibited by the cæcum and nates were exhibited by the smaller-brained and longer-armed but rounder-skulled and shorter-jawed Gibbons.

Pursuing the comparison through the complexities of the bony framework, he might first glance at the more obvious proportions; and such, indeed, as would be given by the entire animal. The characteristics of the limbs in Man are their near equality of length, but the lower limbs are the longest. The arms in Man reach to below the middle of the thigh; in the Gorilla they nearly attain the knee; in the Chimpanzee they reach below the knee; in the Orang they reach the ankle; in the Siamang they reach the sole; in most Gibbons the whole palm can be applied to the ground without the trunk being bent forward beyond its naturally inclined position on the legs. These gradational differences coincide with other characters determining the relative proximity to Man of the apes compared. In no *Quadruman*a does the humerus exceed the ulna so much in length as in Man; only in the most anthropoid, viz. the Gorilla and Chimpanzee, does it exceed the ulna at all in length; in the rest, as in the lower quadrupeds, the fore-arm is longer than the arm.

The humerus, in the Gorilla, though less long, compared with the ulna, than in Man, is longer than in the Chimpanzee; in the Orang it is shorter than the ulna; in the Siamang and other Gibbons it is much shorter, the peculiar length of arm in those "long-armed" apes is chiefly due to the excessive length of the antibrachial bones.

The difference in the length of the upper limbs, as compared with the trunk, is but little between Man and the Gorilla. The elbow-joint in the Gorilla, as the arm hangs down, is opposite the "labrum ilii," the wrist opposite the "tuber ischii;" it is rather lower down in the Chimpanzee; it is opposite the knee-joint in the Orang; it is opposite the ankle-joint in the Siamang.

Man's perfect hand is one of his peculiar physical characters; that perfection is mainly due to the extreme differentiation of the first from the other four digits, and its concomitant power of opposing them as a perfect thumb. An opposable thumb is present in the hand of most *Quadruman*a, but is usually a small appendage compared with that of Man. It is relatively largest in the Gorilla. In this ape the thumb reaches to a little beyond the base of the first phalanx of the fore-finger; it does not reach to the end of the metacarpal bone of the fore-finger in the Chimpanzee, Orang, or Gibbon; it is relatively smallest in the last tailless ape. In Man the thumb extends to or beyond the middle of the first phalanx of the fore-finger. The philosophical zoologist will see great significance in the results of this comparison. Only in the Gorilla and Chimpanzee are the carpal bones eight in number, as in man; in the Orangs and Gibbons they are nine in number, as in the tailed monkeys.

The scapulæ are broader in the Gorilla than in the Chimpanzee, Orang, or long-armed apes; they come nearer to the proportions of that bone in Man. But a more decisive resemblance to the human structure is presented by the iliac bones. In no other ape than the Gorilla do they bend forward, so as to produce a pelvic concavity; nor are they so broad in proportion to their length in any ape as in the Gorilla. In both the Chimpanzee and Orang the iliac bones are

flat, or present a concavity rather at the back than at the fore part. In the Siamang they are not only flat, but are narrower and longer, resembling the iliac bones of tailed monkeys and ordinary quadrupeds.

The lower limbs, though characteristically short in the Gorilla, are longer in proportion to the upper limbs, and also to the entire trunk, than in the Chimpanzee; they are much longer in both proportions and more robust than in the Orangs or Gibbons. But the guiding points of comparisons here are the heel and the hallux.

The heel in the Gorilla makes a more decided backward projection than in the Chimpanzee; the heelbone is relatively thicker, deeper, more expanded vertically at its hind end, beside being fully as long as in the Chimpanzee: it is in the Gorilla shaped and proportioned more like the human calcaneum than in any other ape. Among all the tailless apes the calcaneum in the Siamang and other Gibbons least resembles in its shape or proportional size that of Man.

Although the foot be articulated to the leg with a slight inversion of the sole it is more nearly plantigrade in the Gorilla than in the Chimpanzee. The Orang departs far, and the Gibbons farther, from the human type in the inverted position of the foot.

The great toe which forms the fulcrum in standing or walking is, perhaps, the most characteristic peculiarity in the human structure; it is that modification which differentiates the foot from the hand, and gives the character to the order *Bimana*. In the degree of its approach to this development of the hallux the quadrumanous animal makes a true step in affinity to Man.

The Orang-utan and the Siamang, tried by this test, descend far and abruptly below the Chimpanzee and Gorilla in the scale. In the Orang the hallux does not reach to the end of the metacarpal of the second toe; in the Chimpanzee and Gorilla it reaches to the end of the first phalanx of the second toe; but in the Gorilla the hallux is thicker and stronger than in the Chimpanzee. In both, however, it is a true thumb, by position, diverging from the other toes, in the Gorilla, at an angle of 60° from the axis of the foot.

Man has twelve pairs of ribs, the Gorilla and Chimpanzee have thirteen pairs, the Orangs have twelve pairs, the Gibbons have thirteen pairs. Were the naturalist to trust to this single character, as some have trusted to the cranio-facial one, and in equal ignorance of the real condition and value of both, he might think that the Orangs (*Pithecus*) were nearer akin to man than the Chimpanzees (*Troglodytes*) are. But man has sometimes a thirteenth pair of ribs; and what we term "ribs" are but vertebral elements or appendages common to nearly all the true vertebræ in man, and only so called, when they become long and free. The genera *Homo*, *Troglodytes*, and *Pithecus*, have precisely the same number of vertebræ; if *Troglodytes*, by the development and mobility of the pleurapophyses of the twentieth vertebra from the occiput, seem to have an additional thoracic vertebra, it has one vertebra less in the lumbar region. So, if there be, as has been observed, a difference in the number of sacral vertebræ, it is merely due to a last lumbar having coalesced with what we reckon as the first sacral vertebra in Man.

The thirteen pairs of ribs, therefore, in the Gorilla and Chimpanzee, are of no weight, as against the really important characters significant of affinity with the human type. But, supposing the fact of any real value, how do the advocates of the superior resemblance of the Siamang's or Gibbon's skeleton to that of man dispose of the thirteenth pair of ribs?

In applying the characters of the skull to the determination of the important question at issue, those must first be ascertained by which the genus *Homo* trenchantly differs from the genus *Simia*, of Linnaeus. To determine these osteal distinctions, the author stated that he had compared the skulls of many individuals of different varieties of the human race together with those of the male, female, and young of species of *Troglodytes*, *Pithecus*, and *Hylobates*; Professor Owen referred to his 'Catalogue of the Osteological Series in the Museum of the Royal College of Surgeons,' 4to, 1853, for the detailed results of these comparisons. On the present occasion he would restrict himself to a few of these results.

The first and most obvious differential character is the globular form of the brain-case, and its superior relative size to the face, especially the jaws, in man. But this, for the reasons he had already assigned, is not an instructive or decisive character, when comparing quadrumanous species, in reference to the question at issue. It is exaggerated in the human child, owing to the acquisition of its full, or nearly full size, by the brain, before the jaws have expanded to lodge the second set of teeth. It is an anthropoid character in which the *Quadrumana* resemble man, in proportion to the diminution of their general bulk. If a Gorilla, with milk-teeth, have a somewhat larger brain and brain-case than a Chimpanzee at the same immature age, the acquisition of greater bulk by the Gorilla, and of a more formidable physical development of the skull, in reference to the great canines in the male, will give to the Chimpanzee the appearance of a more anthropoid character, which really does not belong to it,—which could be as little depended upon in a question of precise affinity as the like more anthropoid characters of the female, as compared with the male, Gorilla or Chimpanzee.

Much more important and significant were the following characters of the human skull:—the position and plane of the occipital foramen; the proportional size of the condyloid and petrous processes; the mastoid processes, which relate to balancing the head upon the trunk in the erect attitude; the small premaxillaries and concomitant small size of the incisor teeth, as compared with the molar teeth. The latter character relates to the superiority of the psychical over the physical powers in man: it governs the feature in which man recedes from the brute; as does also the prominence of the nasal bones in most, and in all the typical, races of man. The somewhat angular form of the bony orbits, tending to a square, with the corners rounded off, is a good human character of the skull, which is difficult to comprehend as an adaptive one, and therefore the better in the present inquiry. The same may be said of the production of the floor of the tympanic or auditory tube into the plate called "vaginal."

Believing the foregoing to be sufficient to test the respective degrees of affinity to man within the limited group of *Quadrupana* to which it was proposed, in the present memoir, to apply them, the author would not dilute his argument by citing minor characters. The question at issue was the respective degrees of affinity as between the anthropoid apes and man. Cuvier deemed the Orang (*Pithecus*) to be nearer akin to man than the Chimpanzee (*Troglodytes*) is. That belief has long ceased to be entertained. Professor Owen proceeded, therefore, to compare the Gorilla, Chimpanzee, and Gibbon, in reference to their human affinities.

Most naturalists entering upon this question would first look to the premaxillary bones, or, owing to the early confluence of those bones with the maxillaries in the Gorilla and Chimpanzee, to the part of the upper jaw containing the incisive teeth, on the size and direction of which depends the prognathic or brutish character of a skull. Now the extent of the premaxillaries below the nostril is not only relatively but absolutely less in the Gorilla, and consequently the profile of the skull is less convex at this part, or less "prognathic" than in the Chimpanzee. Notwithstanding the degree in which the skull of the Gorilla surpasses in size that of the Chimpanzee, especially when the two are compared on a front view, the breadth of the premaxillaries and of the four incisive teeth is the same in both. In the relative degree, therefore, in which these bones are smaller than in the Chimpanzee, the Gorilla, in this most important character, comes nearer to Man. In the Gibbons the incisors are relatively smaller than in the Gorilla, but the premaxillaries bear the same proportional size in the adult male Siamang.

Next, as regards the nasal bones. In the Chimpanzee, as in the Orangs and Gibbons, they are as flat to the face as in any of the lower *Simiæ*. In the Gorilla, the median coalesced margins of the upper half of the nasal bones are produced forward, in a slight degree it is true, but affording a most significant evidence of nearer resemblance to Man. In the same degree they impress that anthropic feature upon the face of the living Gorilla. In some pig-faced baboons there are ridges and prominences in the naso-facial part of the skull, but they do not really affect the question as between the Gorilla and Chimpanzee. All naturalists know that the *Semnopitheques* of Borneo have long noses, but the proboscideiform appendage which gives so ludicrous a mask to those monkeys is unaccompanied by any such modification of the nose-bones as gives the true anthropoid character to the human skull, and to which only the Gorilla, in the ape tribe, makes any approximation.

No Orang, Chimpanzee, or Gibbon shows any rudiment of mastoid processes; but they are present in the Gorilla, smaller indeed than in Man, but unmistakeable; they are, as in Man, cellular, pneumatic, and with a thin outer plate of bone. This fact led the author, in a former memoir, to express, when, in respect to the Gorilla, only the skull had reached him, the following inference, viz.: "from the nearer approach which the Gorilla makes to Man in comparison with the Chimpanzee or Orang, in regard to the mastoid processes, that it assumed more nearly and more habitually the

upright attitude than those inferior anthropoid apes do.”* This inference has been fully borne out by the rest of the skeleton of the Gorilla, subsequently acquired.

In the Chimpanzee, as in the Orangs, Gibbons, and inferior *Simiæ*, the lower surface of the long tympanic or auditory process is more or less flat and smooth, developing in the Chimpanzee only a slight tubercle, anterior to the stylohyal pit. In the Gorilla the auditory process is more or less convex below, and develops a ridge, answering to the vaginal process, on the outer side of the carotid canal. The processes posterior and internal to the glenoid articular surface are better developed, especially the internal one, in the Gorilla than in the Chimpanzee; the ridge which extends from the ectopterygoid along the inner border of the foramen ovale, terminates in the Gorilla by an angle or process answering to that called “styliform” or “spinous” in Man, but of which there is no trace in the Chimpanzee, Orang, or Gibbon.

The orbits have a full oval form in the Orang; they are almost circular in the Chimpanzee and Siamang, more nearly circular, and with a more prominent rim in the smaller Gibbons; in the Gorilla alone do they present the form which used to be deemed peculiar to man. There is not much physiological significance in some of the latter characters, but on that very account, the author deemed them more instructive and guiding in the actual comparison. The occipital foramen is nearer the back part of the cranium, and its plane is more sloping, less horizontal in the Siamang than in the Chimpanzee and Gorilla. Considering the less relative prominence of the fore-part of the jaws in the Siamang, as compared with the Chimpanzee, the occipital character of that Gibbon and of other species of *Hylobates* marks well their inferior position in the quadrumanous scale.

In the greater relative size of the molars, compared with the incisors, the Gorilla makes an important closer step towards Man than does the Chimpanzee. The molar teeth are relatively so small in the Siamang, that, notwithstanding the small size of the incisors, the proportion of those teeth to the molars is only the same as in the Gorilla: in other Gibbons (*Hylobates lar*), the four lower incisors occupy an extent equal to that of the first four molars, in the Chimpanzee equal to that of the first three molars, in the Siamang equal to that of the first two molars and rather more than half of the third, in Man equal to the first two molars and half of the third; in this comparison the term molar is extended to the bicuspid.

The proportion of the ascending ramus to the length of the lower jaw tests the relative affinity of the tailless apes to Man.

In a profile of the lower jaw, the author compares the line drawn vertically from the top of the coronoid process to the horizontal length along the alveoli. In Man and the Gorilla it is about $\frac{7}{10}$ ths, in the Chimpanzee $\frac{6}{10}$ ths, in the Siamang it is only $\frac{4}{10}$ ths. The Siamang further differs in the shape and production of the angle of the jaw, and in the shape of the coronoid process, approaching the lower *Simiæ*

* Transactions of the Zoological Society, vol. iii. p. 409.

in both these characters. In the size of the post-glenoid process, in the shape of the glenoid cavity which is almost flat, in the proportional size of the petrous bone, and in the position of the foramen caroticum, the Siamang departs further from the human type, and approaches nearer that of the tailed *Simia*, than the Gorilla does, and in a marked degree.

Every legitimate deduction from a comparison of cranial characters makes the tailless *Quadruman* recede from the human type in the following order :—Gorilla, Chimpanzee, Orangs, Gibbons, and the last named in a greater and more decided degree.

These comparisons have of late been invested with additional interest from the discoveries of remains of quadrumanous species in different members of the tertiary formations.

The first quadrumanous fossil, the discovery of which by Lieuts. Baker and Durand is recorded in the 'Journal of the Asiatic Society of Bengal,' for November, 1836, has proved to belong, like subsequently discovered quadrumanous fossils in the Sewalik (probably miocene) tertiaries, to the Indian genus *Semnopithecus*. The quadrumanous fossils discovered in 1839, in the eocene deposits of Suffolk, belong to a genus (*Eopithecus*) having its nearest affinities with *Macacus*. The monkey's molar tooth from the pliocene beds of Essex is most closely allied to the *Macacus sinicus*. The remains of the large monkey, four feet in height, discovered in 1839 by Dr. Lund in a limestone cavern in Brazil was shown by its molar dentition ($p \frac{3-3}{3-3}, m \frac{3-3}{3-3}$) to belong to the platyrrhine family now peculiar to South America. The lower jaw and teeth of the small quadrumane discovered by M. Lartet in a miocene bed of the South of France, and described by him and De Blainville, are so closely allied to the Gibbons, as scarcely to justify the generic separation which has been made for it under the name *Pliopithecus*.

Finally, a portion of a lower jaw with teeth and the shaft of a humerus of a quadrumanous animal (*Dryopithecus*), equalling the size of those bones in Man, have been discovered by M. Fontan, of Saint-Gaudens, in a marly bed of Upper Miocene age, forming the base of the plateau on which that town is built. The molar teeth present the type of grinding surface of those of the Gibbons (*Hylobates*), and, as in that genus, the second true molar is larger than the first, not of equal size, as in the human subject and Chimpanzee. The premolars have a greater antero-posterior extent, relatively, than in the Chimpanzee, and in this respect agree more with those in the Siamang. The first premolar has the outer cusp raised to double the height of that of the second; its inner lobe appears from M. Lartet's figure to be less developed than in the Gorilla, certainly less than in the Chimpanzee. The posterior talon of the second premolar is more developed, and consequently the fore and aft extent of the tooth is greater than in the Chimpanzee; thereby the second premolar of *Dryopithecus* more resembles that in *Hylobates*, and departs further from the human type.

The canine, judging from the figures published by M. Lartet*,

* 'Comptes Rendus de l'Académie des Sciences.' Paris, vol. xliii.

seems to be less developed than in the male Chimpanzee, Gorilla, or Orang ; in which character the fossil, if it belonged to a male, makes a nearer approach to the human type : but it is one which many of the inferior monkeys also exhibit, and is by no means to be trusted as significant of true affinity, supposing even the sex of the fossil to be known as being male.

The shaft of the humerus, found with the jaw, is peculiarly rounded, as it is in the Gibbons and Sloths, and offers none of those angularities and ridges which make the same bone in the Chimpanzee and Orang come so much nearer in shape to the humerus of the human subject. The fore part of the jaw, as in the Siamang, is more nearly vertical than in the Gorilla or Chimpanzee ; but whether the back part of the jaw may not have departed in a greater degree from the human type than the fore part approaches it, as is the case in the Siamang, the state of the fossil does not allow of determining. One significant character is, however, present,—the shape of the fore part of the coronoid process. It is slightly convex forwards, which causes the angle it forms with the alveolar border to be less open. The same character is present in the Gibbons. The front margin of the lower half of the coronoid process in Man is concave, as it is likewise in the Gorilla and Chimpanzee. Prof. Owen was acquainted with this interesting fossil, referred to a genus called *Dryopithecus*, only by the figures published in the 43rd volume of the 'Comptes Rendus de l'Académie des Sciences.' From these it appears that the canine, two premolars, and first and second true molars, are in place ; the socket of the third molar is empty, but widely open above ; from which the author concludes that the third molar had also cut the gum, the crown being completed, but not the fangs. If the last molar had existed as a mere germ, it would more probably have been preserved in the substance of the jaw.

In a young Siamang, with the points of the permanent canines just protruding from the socket, exhibited by Prof. Owen, the crown of the last molar was complete, and on a level with the base of that of the penultimate molar ; whence he inferred that the last molar would have cut the gum as soon as, if not before, the crown of the canine had been completely extricated. This dental character, the conformation and relative size of the grinding teeth, especially the fore and aft extent of the premolars, all indicate the close affinity of the *Dryopithecus* with the *Pliopithecus* and existing Gibbons ; and this, the sole legitimate deduction from the maxillary and dental fossils, is corroborated by the fossil humerus, fig. 9, in the above-cited plate.

There is no law of correlation, by which, from the portion of jaw with teeth of the *Dryopithecus*, can be deduced the shape of the nasal bones and orbits, the position and plane of the occipital foramen, the presence of mastoid and vaginal processes, or other cranial characters determinative of affinity to Man ; much less any ground for inferring the proportions of the upper to the lower limbs, of the humerus to the ulna, of the pollex to the manus, or the shape and development of the iliac bones. All those characters which do determine the closer resemblance and affinity of the genus *Troglodytes*

to man, and of the genus *Hylobates* to the tailed monkeys, are at present unknown in respect of the *Dryopithecus*. A glance at fig. 5 (*Gorilla*), and fig. 7 (*Dryopithecus*), of the plate of M. Lartet's memoir, would suffice to teach their difference of bulk, the *Gorilla* being fully one-third larger. The statement that the parts of the skeleton of the *Dryopithecus* as yet known, viz. the two branches of the lower jaw and the humerus, "are sufficient to show that in anatomical structure, as well as stature, it came nearer to man than any quadrumanous species, living or fossil, before known to zoologists*," is without the support of any adequate fact, and in contradiction of most of those to be deduced from M. Lartet's figures of the fossils. Those parts of the *Dryopithecus* merely show—and the humerus in a striking manner—its nearer approach to the Gibbons; the most probable conjecture being that it bore to them, in regard to size, the like relations which Dr. Lund's *Protopithecus* bore to the existing *Myacetes*. Whether, therefore, strata of such high antiquity as the miocene may reveal to us "forms in any degree intermediate between the Chimpanzee and man" awaits an answer from discoveries yet to be made; and the anticipation that the fossil world "may hereafter supply new osteological links between man and the highest known Quadrumana†" must be kept in abeyance until that world has furnished us with the proofs that a species did formerly exist which came as near to man as does the Orang, the Chimpanzee, or the *Gorilla*.

Of the nature and habits of the last-named species, which really offers the nearest approach to man of any known ape, recent or fossil, the author had received many statements from individuals resident at or visitors to the Gaboon, from which he selected the following as most probable, or least questionable.

Gorilla-land is a richly-wooded extent of the western part of Africa, traversed by the rivers *Danger* and *Gaboon*, and extending from the equator to the 10th or 15th degree of south latitude. The part where the *Gorilla* has been most frequently met with presents a succession of hill and dale, the heights crowned with lofty trees, the valleys covered by coarse grass, with partial scrub or scattered shrubs. Fruit trees of various kinds abound both on the hills and in the valleys; some that are crude and uncared for by the *Negros* are sought out and greedily eaten by the *Gorillas*; and as different kinds come to maturity at different seasons, they afford the great denizen of the woods a successive and unfailing supply of indigenous fruits. Of these Professor Owen specified the following sources:—

The palm-nut (*Elais guiniensis*) of which the *Gorillas* greatly affect the fruit and upper part of the stipe, called the "cabbage." The *Negroes* of the *Gaboon* have a tradition that their forefathers first learnt to eat the "cabbage," from seeing the *Gorilla* eat it, concluding that what was good for him must be good for man.

The "ginger-bread tree" (*Parinarium excelsum*), which bears a plum-like fruit.

* Lyell (Sir Charles), 'Supplement to the Fifth Edition of Manual of Elementary Geology,' 8vo, 1859, p. 14.

† Ibid.

The papau tree (*Carica papaya*).

The banana (*Musa sapientum*), and another species (*Musa paradisiaca*).

The *Amomum Afzelii* and *Am. grandiflorum*.

A tree, with a shelled fruit, like a walnut, which the Gorilla breaks open with the blow of a stone.

A tree, also botanically unknown, with a fruit like a cherry.

Such fruits and other rich and nutritious productions of the vegetable kingdom, constitute the staple food of the Gorilla, as they do of the Chimpanzee. The molar teeth, which alone truly indicate the diet of an animal, accord with the statements as to the frugivorous character of the Gorilla: but they also sufficiently answer to an omnivorous habit to suggest that the eggs and callow brood of nests discovered in the trees frequented by the Gorilla might not be unacceptable.

The Gorilla makes a sleeping place like a hammock, connecting the branches of a sheltered and thickly-leaved part of a tree by means of the long tough slender stems of parasitic plants, and lining it with the broad dried fronds of palms, or with long grass. This hammock-like abode may be seen at different heights, from 10 to 40 feet from the ground, but there is never more than one such nest in a tree.

They avoid the abodes of man, but are most commonly seen in the months of September, October, and November, after the negroes have gathered their outlying rice-crops, and have returned from the "bush" to the village. So observed, they are described to be usually in pairs; or, if more, the addition consists of a few young ones, of different ages, and apparently of one family. The Gorilla is not gregarious. The parents may be seen sitting on a branch, resting the back against the tree-trunk—the hair being generally rubbed off the back of the old Gorilla from that habit—perhaps munching fruit, whilst the young Gorillas are at play, leaping and swinging from branch to branch, with hoots or harsh cries of boisterous mirth.

If the old male be seen alone, or when in quest of food, he is usually armed with a stout stick, which the negroes aver to be the weapon with which he attacks his chief enemy the elephant. Not that the elephant directly or intentionally injures the Gorilla, but, deriving its subsistence from the same source, the ape regards the great proboscidian as a hostile intruder. When, therefore, he discerns the elephant pulling down and wrenching off the branches of a favourite tree, the Gorilla, stealing along the bough, strikes the sensitive proboscis of the elephant with a violent blow of his club, and drives off the startled giant trumpeting shrilly with rage and pain.

In passing from one detached tree to another, the Gorilla is said to walk semi-erect, with the aid of his club, but with a waddling awkward gait; when without a stick, he has been seen to walk as a biped, with his hands clasped across the back of his head, instinctively so counterpoising its forward projection. If the Gorilla be surprised and approached while on the ground, he drops his stick, betakes himself to all-fours, applying the back part of the bent

knuckles of his fore-hands to the ground, and makes his way rapidly, with an oblique swinging kind of gallop, to the nearest tree. There he awaits his pursuer, especially if his family be near, and requiring his defence. No negro willingly approaches the tree in which the male Gorilla keeps guard. Even with a gun the experienced negro does not make the attack, but reserves his fire in self-defence. The enmity of the Gorilla to the whole negro race, male and female, is uniformly attested.

The young men of the Gaboon tribe make armed excursions into the forests, in quest of ivory. The enemy they most dread on these occasions is the Gorilla. If they have come unawares too near him with his family, he does not, like the lion, sulkily retreat, but comes rapidly to the attack, swinging down to the lower branches, and clutching at the nearest foe. The hideous aspect of the animal, with his green eyes flashing with rage, is heightened by the skin over the prominent roof of the orbits being drawn rapidly backward and forward, with the hair erected, causing a horrible and fiendish scowl. If fired at and not mortally hit, the Gorilla closes at once upon his assailant, and inflicts most dangerous, if not deadly wounds, with his sharp and powerful tusks. The commander of a Bristol trader told the author he had seen a negro at the Gaboon frightfully mutilated by the bite of the Gorilla, from which he had recovered. Another negro exhibited to the same voyager a gun-barrel bent and partly flattened by the bite of a wounded Gorilla, in its death-struggle. Negroes, when stealing through the gloomy shades of the tropical forest, become sometimes aware of the proximity of one of these frightfully formidable apes by the sudden disappearance of one of their companions, who is hoisted up into the tree, uttering, perhaps, a short choking cry. In a few minutes he falls to the ground a strangled corpse. The Gorilla, watching his opportunity, has let down his huge hind-hand, seized the passing negro by the neck, with vice-like grip, has drawn him up to higher branches, and dropped him when his struggles had ceased.

The strength of the Gorilla is such as to make him a match for a lion, whose tusks his own almost rival. Over the leopard, invading the lower branches of the Gorilla's dwelling-tree, he will gain an easier victory; and the huge canines, with which only the male Gorilla is furnished, doubtless have been assigned to him for defending his mate and offspring.

The skeleton of the old male Gorilla obtained for the British Museum in 1857, shows an extensive fracture, badly united, of the left arm-bone, which has been shortened, and gives evidence of long suffering from abscess and partial exfoliation of bone. The upper canines have been wrenched out or shed some time before death, for their sockets have become absorbed.

The redeeming quality in this fragmentary history of the Gorilla is the male's care of his family, and the female's devotion to her young.

It is reported that a French natural-history collector, accompanying a party of the Gaboon negroes into the Gorilla woods, surprised a female with two young ones on a large boabdad (*Adansonia*), which

stood some distance from the nearest clump. She descended the tree with her youngest clinging to her neck, and made off rapidly on all fours to the forest, and escaped. The deserted young one on seeing the approach of the men began to utter piercing cries: the mother, having disposed of her infant in safety, returned to rescue the older offspring, but before she could descend with it her retreat was cut off. Seeing one of the negroes level his musket at her, she, clasping her young with one arm, waved the other, as if deprecating the shot: the ball passed through her heart, and she fell with her young one clinging to her. It was a male, and survived the voyage to Havre, where it died on arriving. Professor Owen had examined the skeleton of this young Gorilla in the museum of natural history at Caen, and was indebted to Professor Deslongchamps, Dean of the Faculty of Sciences in that town, for drawings of the skeleton of this rare specimen.

There might be more difficulty in obtaining a young Gorilla for exhibition than a young Chimpanzee; but as no full-grown Chimpanzee has ever been captured, we cannot expect the larger and much more powerful adult Gorilla to be ever taken alive. A bold negro, the leader of an elephant-hunting expedition, being offered a hundred dollars if he would bring back a live Gorilla, replied, "If you gave me the weight of yonder hill in gold coins, I could not do it!"

All the terms of the aborigines in reference to the Gorilla imply their opinion of his close kinship to themselves. But they have a low opinion of his intelligence. They say that during the rainy season he builds a house without a roof. The natives on their hunting excursions light fires for their comfort and protection by night; when they have gone away, they affirm that the Gorilla will come down and warm himself at the smouldering embers, but has not wit enough to throw on more wood, out of the surrounding abundance, to keep the fire burning,—“the stupid old man!”

Every account of the habits of a wild animal obtained at second hand from the reports of aborigines has, commonly, its proportion of “apocrypha.” The author had restricted himself to the statements that had most probability and were in accordance with the ascertained structures and powers of the animal, and would only add the averment and belief of the Gaboon negroes, that when a Gorilla dies, his fellows cover the corpse with a heap of leaves and loose earth collected and scraped up for the purpose.

A most singular phenomenon in natural history, if one reflects on the relations of things, is this Gorilla! Limited as it is in its numbers and geographical range, one discerns that the very peculiar conditions of its existence—abundance of wild fruit—needs must be restricted in space; but concurring in a certain part of Africa, there lives the creature to enjoy them.

The like conditions exist in Borneo and Sumatra, and there also a correlative human-like ape, of similar nature, tooth-armour, and force, exists at their expense. Neither Ourangs nor Gorillas however minister to man's use either directly or indirectly. Were they to become extinct, no sign of the change or break in the links of life would remain. What may be their real significance?

Reverting finally to the ancient notices which might relate to the great anthropoid ape of Africa, Prof. Owen referred to his first Memoir, of February, 1848, in which was quoted (*Trans. Zool. Soc.*, vol. iii. p. 418) Dr. Falconer's 'Translation of the Voyage of Hanno,' (London, 1797) with his dissertation vindicating the authenticity of the "Periplus." Professor Owen had lately been favoured by the venerable Bishop Maltby, the first amongst our Greek scholars, with the following translation of the passage supposed to allude to the species in question:—"On the third day, having sailed from thence, passing the streams of fire, we came to a bay called the Horn of the South. In the recess there was an island like the first, having a lake, and in this there was another island full of wild men. But much the greater part of them were women, with hairy bodies, whom the interpreters called 'Gorillas.' But, pursuing them, we were not able to take the men; they all escaped, being able to climb the precipices, and defended themselves with pieces of rock. But three women (females), who bit and scratched those who led them, were not willing to follow. However, having killed them, we flayed them, and conveyed the skins to Carthage; for we did not sail any further, as provisions began to fail." This encounter indicates, therefore, the southernmost point on the west coast of Africa reached by the Carthaginian navigator.

To the inquiry by Bishop Maltby, how far the newly-discovered great ape of Africa bore upon the question of the authenticity of the Periplus, Prof. Owen had replied:—"The size and form of the great ape, now called 'Gorilla,' would suggest to Hanno and his crew no other idea of its nature than that of a kind of human being; but the climbing faculty, the hairy body, and skinning of the dead specimens, strongly suggest that they were large anthropoid apes. The fact that such apes, having the closest observed resemblance to the negro, being of human stature and with hairy bodies, do still exist on the west coast of Africa, renders it highly probable that such were the creatures which Hanno saw, captured, and called 'Gorullai.'"

The brief observation made by Battell in west tropical Africa, 1590, recorded in Purchas's "Pilgrimages, or Relations of the World," 1748, of the nature and habits of the large human-like ape which he calls "Pongo," more decidedly refers to the Gorilla. Other notices, as by Nieremberg and Bosman, applied by Buffon to Battell's Pongo, were deemed valueless by Cuvier, who altogether rejected the conclusions of his great predecessor as to the existence of any such ape. "This name of Pongo or Boggo, given in Africa to the Chimpanzee or to the Mandril, has been applied," writes Cuvier, "by Buffon to a pretended great species of Ourang-utan, which was nothing more than the imaginary product of his combinations." After the publication of Cuvier's '*Règne Animal*,' the supposed species was, by the high authority of its author, banished from natural history; it has only been authentically reintroduced since the intelligent attention of Dr. Savage was directed to the skull which he first saw at the Gaboon in 1847, and took Professor Owen's opinion upon.